

Evaluation of MerCAP™ for Power Plant Mercury Control

Quarterly Technical Progress Report

October 1, 2004 – December 31, 2004

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ABSTRACT

This document summarizes progress on Cooperative Agreement DE-FC26-03NT41993, “Evaluation of MerCAP™ for Power Plant Mercury Control,” during the time-period October 1, 2004 through December 31, 2004. The objective of this project is to demonstrate the performance of MerCAP™, a technology that uses a fixed sorbent downstream of wet and dry scrubbers for removing mercury from coal-combustion flue gas. The project is being funded by the U.S. DOE National Energy Technology Laboratory under this Cooperative Agreement. EPRI, Great River Energy, and Southern Company are project co-funders. URS Group is the prime contractor.

The general concept for MerCAP™ is to place fixed structure sorbents into a flue gas stream to adsorb mercury and then, as the sorbent surfaces become saturated, thermally or chemically regenerate the sorbent and recover the mercury. One example includes parallel gold-coated plates. Mercury forms an amalgam with the gold and is removed from the flue gas flowing past the plates. The captured mercury can be subsequently sequestered using a carbon canister or cryogenic trap during regeneration.

In this project, URS Group and its team will conduct tests at two host power plants to evaluate gold MerCAP™ performance downstream of a spray dryer-baghouse and wet scrubber over an extended period of flue-gas exposure. The spray dryer site, identified in this proposal as Site 1, is Great River Energy’s Stanton Station, which burns a ND lignite coal. At this site, an array of gold-coated MerCAP™ plates will be incorporated into the outlet plenum of one compartment (6 MWe) of the Unit 10 baghouse. Site 2, the wet scrubber site, is Southern Company Services’ Plant Yates Unit 1, which burns an Eastern bituminous coal. An array of gold-coated structures will be configured in a 2800 acfm slipstream (1 MWe equivalent) receiving flue gas immediately downstream of a full-scale FGD absorber. MerCAP™ will be evaluated for mercury removal during normal boiler operation for periods of six months at both sites.

The ability to repeatedly thermally or chemically regenerate exposed MerCAP™ plates is a critical component to the overall economics of the technology. Therefore, during the longer-term tests, small-scale tests will be conducted to evaluate the mercury removal effectiveness at both sites following repeated regeneration cycles. Tests will be conducted using a 40-acfm slipstream probe device (“Mini-MerCAP™ probe”). Gold-coated substrates from the same production batch used for the MerCAP™ arrays in the larger longer-term tests will be used in the Mini-MerCAP™ probe.

MerCAP™ technology has been successfully tested in small-scale units installed at the proposed test sites. Results of the study will verify this performance at a larger scale and over a longer period of gas exposure and will provide data required for assessing the feasibility and costs of a full-scale MerCAP™ application.

During this reporting period three sets of periodic performance measurements were carried out to evaluate and document the continued mercury removal performance of the MerCAP™ array installed at Site 1. In addition, two sets of additional MerCAP™ substrates were installed to

evaluate the effects of plate spacing and of the acid-wash pretreatment on the overall mercury removal performance of the MerCAP™ technology at Site 1. A planning meeting for the MerCAP™ installation at Site 2 was held at Georgia Power's Plant Yates, and the conceptual design for the MerCAP™ installation at Site 2 was finalized. Work was initiated on the design of the MerCAP™ unit as well as the fabrication of the instrumentation and data logging system for the Yates installation.

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INTRODUCTION

This document is the fifth quarterly Technical Progress Report for the project “Evaluation of MerCAP™ for Power Plant Mercury Control,” (DE-FC26-03NT41993) for the time-period October 1, 2004 through December 31, 2004. The objective of this project is to demonstrate the performance of MerCAP™ a technology that uses a fixed sorbent downstream of wet and dry scrubbers for removing mercury from coal-combustion flue gas. The project is being funded by the U.S. DOE National Energy Technology Laboratory under this Cooperative Agreement. EPRI, Great River Energy, and Southern Company are project co-funders. URS Group is the prime contractor.

The general concept for MerCAP™ is to place fixed structure sorbents into a flue gas stream to adsorb mercury and then, as the sorbent surfaces becomes saturated, thermally or chemically regenerate the sorbent and recover the mercury. One example includes parallel gold-coated plates. Mercury forms an amalgam with the gold and is removed from the flue gas flowing past the plates. The captured mercury can be subsequently sequestered using a carbon canister or cryogenic trap during regeneration. In this project, URS Group and its team will conduct tests at two host power plants to evaluate gold MerCAP™ performance downstream of a spray dryer-baghouse and wet scrubber over an extended period of flue-gas exposure. Testing at each host site will take place for a period of 6 months.

Great River Energy is providing co-funding and technical support to this project and is providing Stanton Station Unit 10 as a host site. Unit 10 fires North Dakota Lignite and is configured with a spray dryer as a dry FGD system, with a downstream baghouse for particulate control. At this site, an array of gold-coated MerCAP™ plates will be incorporated into the outlet plenum of one compartment (6 MWe) of the Unit 10 baghouse.

Southern Company is providing co-funding and technical input to this project and its subsidiary, Georgia Power, is providing its Plant Yates as a host site for testing. Plant Yates Unit 1 fires a low-sulfur bituminous coal and is configured with a small-sized ESP for particulate control, and a downstream CT-121 Jet Bubbler Reactor (JBR) wet FGD system. Gold-coated structures will be configured in a 2800 acfm slipstream downstream of the full-scale FGD absorber.

The ability to repeatedly thermally or chemically regenerate exposed MerCAP™ plates is a critical component to the overall economics of the technology. Therefore, during the longer-term tests, small-scale tests will be conducted to evaluate the mercury removal effectiveness at both sites following repeated regeneration cycles. Tests will be conducted using a 40-acfm slipstream probe device (“Mini-MerCAP™ probe”). Gold-coated substrates from the same production batch used for the MerCAP™ arrays in the larger longer-term tests will be used in the Mini-MerCAP™ probe.

MerCAP™ technology has been successfully tested in small-scale units installed at the proposed test sites. Results of the proposed study will verify this performance at a larger scale and over a longer period of gas exposure and will provide data required for assessing the feasibility and costs of a full-scale MerCAP™ application.

This report describes the activities carried out for this program during the project-reporting period October 1 through December 31, 2004. The remainder of this report is divided into four sections: an Executive Summary followed by sections that describe Experimental Procedures, Results and Discussion, and Conclusions.

EXECUTIVE SUMMARY

Summary of Progress

The current reporting period, October 1, 2004 through December 31, 2004, is the fifth full technical progress reporting period for the project. Efforts during the current period focused on tasks associated monitoring and testing the full-scale MerCAP™ array at Site 1 and design of the Site 2 installation.

Site 1 Activities

Specific activities included the installation of two additional sets of MerCAP™ substrates and performance monitoring of the MerCAP™ array at Site 1. Performance monitoring was carried out three times during this reporting period. Table 1 lists the planned and completed milestones for the first year of this project. A summary of each activity carried out during this reporting period is provided below.

Table 1. Schedule for Year 1 Milestones for this Test Program.

Milestone	Description	Planned Completion	Actual Start/ Completion
1	Submit Hz. Subs. Plan	Q1	Q1/Q1
2	Submit Test Plan	Q1	Q1/Q1
3	Frame Installation/Baseline Monitoring Site 1	Q1	Q1/Q2
4	Site 1 Gold Installation, Intensive Testing	Q1	Q1/Q3
5	Start of Long Term Testing, Site 1	Q3	Q3
6	End of Long Term Site 1, Gas Char Tests	Q3	Q3/Q1(2005)
7	Site 1 Review/ Site 2 Planning Meeting	Q3	Q4
8	Frame Installation/Baseline Monitoring Site 2	Q4	

During this reporting period three sets of periodic performance measurements were carried out at Site 1 to evaluate and document the continued mercury removal performance of the MerCAP™ array. In addition, two sets of additional MerCAP™ substrates were installed to evaluate the effects of plate spacing and of the acid-wash pretreatment on the overall mercury removal performance of the MerCAP™ technology. Table 2 summarizes the performance of the MerCAP™ substrates installed to date at Site 1. Figure 1 shows the overall removal performance of the MerCAP™ array over the duration of the program, which has included a recent fuel switch from North Dakota lignite to Powder River Basin coal at Site 1.

Table 2. MerCAPä Substrate Summary

Duct Section	Substrate	Plate Spacing	Install Date	Hours in Service	Average Hg Removal	Measured Outlet Speciation
Duct 1	Acid Treated	1-Inch	8/22/04	3,123	30 – 35%	35 – 40%
Duct 2	Non-Acid Treated	1-Inch	11/18/04	1,035	15 –18%	20%
Duct 3	Non-Acid Treated	½-Inch	11/18/04	1,035	25 – 30%	20 – 25%
Duct 4	Empty/Baseline	N/A	N/A	N/A	0%	15%

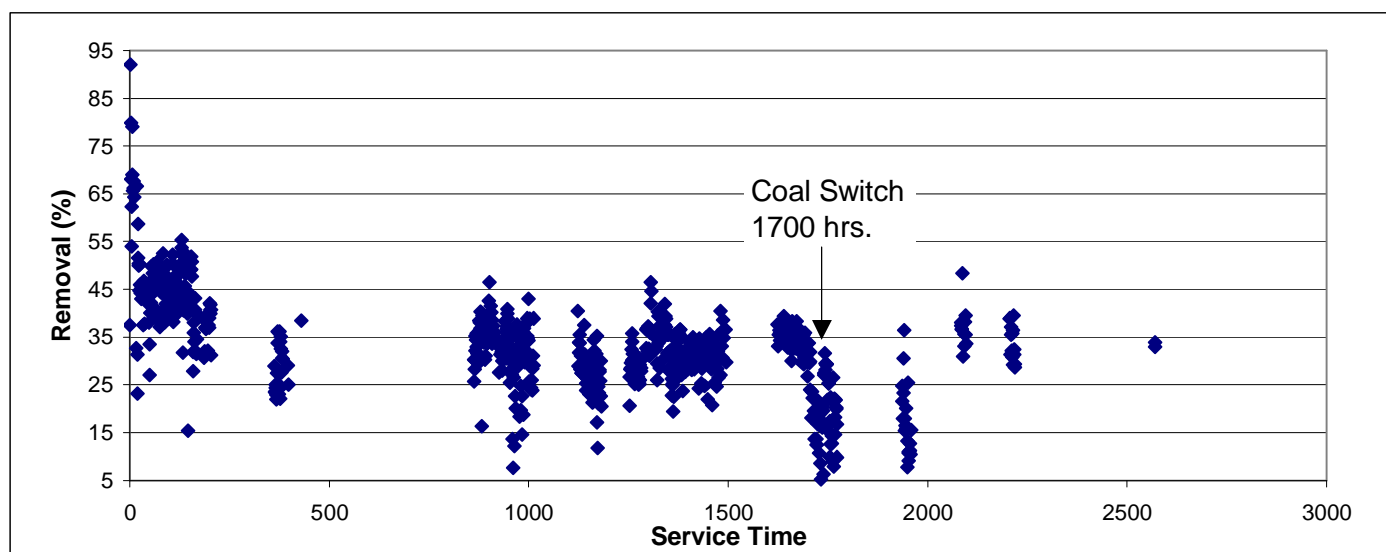


Figure 1. Mercury Removal Performance of the MerCAPä Array to Date at Site 1 (service time presented in Hours of MerCAP™ Operation).

The acid treated gold screens continue to perform better than non-acid treated screens at the same plate spacing. The treated screens show sustained mercury removal of 30-35% whereas the non-treated screens are only able to achieve 15-18% removal. Non-acid treated screens were able to achieve 25-30% removal in duct 3 by doubling the mass of gold by reducing the plate spacing from 1-inch to ½-inch.

The fuel switch from North Dakota lignite to Powder River Basin (PRB) coal seemed to have an initial negative effect on the MerCAP™ unit at Stanton Station. The mercury removal across the gold plates dropped during the initial switch as flue gas temperatures increased within the

baghouse. After a few weeks of firing PRB fuel, the flue gas temperatures returned to levels that were previously seen in the MerCAP™ reactor, and the mercury removal across the gold screens also recovered to previous levels. To date, except for the initial drop in mercury removal, the MerCAP™ system has not been adversely affected by the fuel switch.

Site 2 Activities

Tests at Site 2 will evaluate gold MerCAP™ performance downstream of a wet FGD absorber in flue gas derived from eastern bituminous coal. The fixed sorbent structure will be configured in a flue gas slipstream (approximately 2800 acfm) located downstream of the Plant Yates Unit 1 JBR reactor. The slipstream is part of an existing pilot scrubber setup installed previously by Southern Company. Work during this reporting period included that associated with the design of the Site 2 test unit. A site visit was carried out to walk-down and evaluate the status of the existing pilot setup and determine specific requirements for the MerCAP™ design.

Figure 2 contains the conceptual design that was completed for the MerCAP™ installation at Site 2. A long horizontal run of pipe to the inlet of Southern Company's pilot scrubber was identified as the best location for the installation. This was because the MerCAP™ unit could be easily retrofitted into the existing system at this point, and because the run of pipe is relatively close to the ground which will aid in the future sampling activities as well as configuration and installation of the gold plates. The MerCAP™ reactor will be located just upstream of the pilot scrubber (which will not be operated during the MerCAP™ tests). A fan, configured on the pilot unit, will provide the motive force for the flue gas across the MerCAP™ unit. Flue gas exiting the reactor will be flowed back to the Unit 1 duct.

Wet MerCAP™ Pilot Unit Schematic

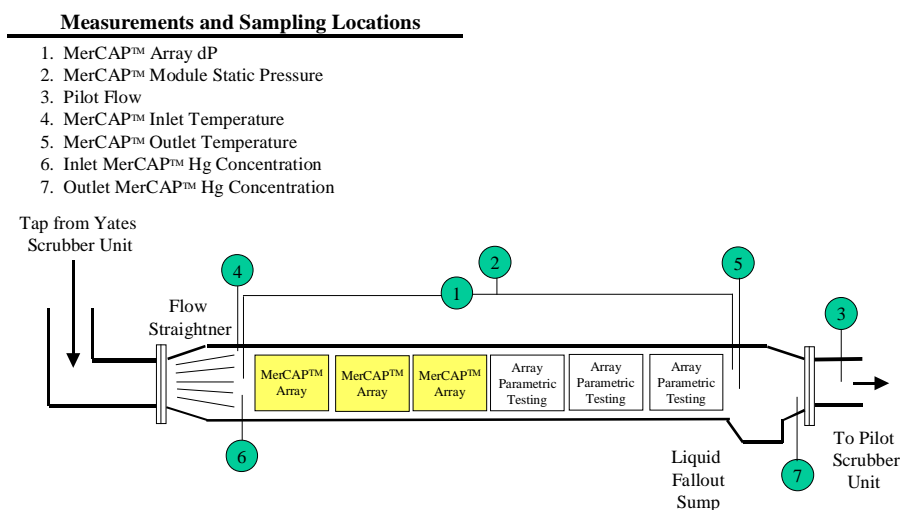


Figure 2. Conceptual Design of Wet MerCAP™ Installation for Site 2

The MerCAP™ reactor will be constantly monitored for inlet and outlet temperature, static pressure, pressure drop, and flow. A data logger located on site will continuously collect this data. Ports fitted upstream and downstream of the gold plates will allow access points for mercury measurements, and a wash water system will also be fitted to the system to allow for periodic cleaning of the gold screens.

Other activities performed during this reporting period included inserting coupons of gold plated screens into the flue gas at Plant Yates Unit 1. These were placed in three locations including the outlet of the ESP, inlet of the JBR scrubber downstream of a quenching spray, and at the stack. These coupons will be extracted and evaluated during the next reporting period.

EPRI funded slipstream MerCAP™ tests have also been ongoing at the stack of Yates Unit 1. These tests incorporate a small reactor drawing approximately 10 acfm of flue gas across three sections of gold plated screens similar to those in the full-scale MerCAP™ installations. The data from these tests are currently being reviewed and will assist in determining optimal operating parameters such as flue gas flow and wash frequency for the larger MerCAP™ reactor at Yates.

Sub-Contracts

An existing sub-contract to Apogee Scientific Inc. was amended for performing tasks related to the MerCAP™ installation at Site 2. As a part of this sub-contract, Apogee has designed the MerCAP™ unit that will be installed at Site 2, and will design and install the instrumentation and data logging system required for the pilot unit. Apogee will also be responsible for delivery of the stainless steel screens for electroplating, as well as fabrication of the frames to hold the gold plated screens in the MerCAP™ unit.

Task Activity Summary

Table 3 lists the current activity status of the primary tasks for this program. The Stanton MerCAP™ testing had been delayed in the first quarter of 2004 due to operation issues at the host site. MerCAP™ installation and testing has been delayed at Plant Yates Unit 1 due to a conflicting DOE carbon injection program at this host site; the latter was delayed due to schedule constraints associated with performance of a long-term demonstration test. The carbon injection program ended in December 2004 and will not interfere with future progress on the MerCAP™ program at this site.

Table 3. Project Activity Status.

Task Number	Description	Planned % Completion	Actual % Completion
1	Project Planning	80%	80%
2	Stanton MerCAP™ Testing	80%	80%
3	Yates MerCAP™ Testing	0%	0%
4	Economic Analysis	0%	0%
5	Project Management & Reporting	40%	40%

Problems Encountered

During this period several bags in the selected compartment at GRE Stanton Station burst and caused the MerCAP™ array to be heavily coated with fly ash. This appeared to cause degradation in the overall performance of the array. To solve the problem the MerCAP™ array was hand-cleaned using compressed air and brushes to remove the fly-ash coating. Performance of the array then returned to previously observed levels. Cleaning of the MerCAP™ substrates was carried out during the same time interval as the installation of the two additional sets of substrates during the third week in November.

Plans for Next Reporting Period

The next reporting period covers the time-period January 1 through March 31, 2005. During this quarter, the long term testing and evaluation of the MerCAP™ array installed at Stanton Station will be completed. Another series of Ontario Hydro measurements will be made to verify the performance and accuracy of the mercury semi-continuous emissions monitors (SCEMs) utilized during periodic performance evaluations.

The remaining regeneration tests for Site 1 will be conducted to further evaluate the impact repeated regeneration cycles have on the MerCAP™ substrates. Thermal regeneration tests utilizing the mini-MerCAP™ probes will be initiated and further chemical regeneration cycles will be performed. During this quarter the MerCAP™ substrates that were recently installed that were not pretreated with an acid wash will be removed and treated with an acid wash. The substrates will then be reinstalled and monitored to observe performance.

The MerCAP™ reactor for Site 2 will be fabricated and installed during the next reporting period. The system will be put into service without gold plates and baseline mercury measurements will be made. The gold plates will be installed after the baseline period and initial mercury measurements will be collected across the unit.

Prospects for Future Progress

During the next reporting period the MerCAP™ substrates installed in duct sections 2 and 3 will be removed and acid treated. The substrates will then be reinstalled and monitored to evaluate mercury removal performance. Samples of the acid wash bath will be taken to quantify the amount of mercury removed by the substrates. After reinstallation of these substrates an evaluation of plate spacing and overall service time on the performance of the technology will be conducted.

Experimental

Two additional sets of MerCAP™ substrates installed during this reporting period were not pretreated with an acid wash. Initial removal compared generally well with the treated substrates previously installed. However degradation of the performance of the untreated substrates was observed over the course of this reporting period. One set of the substrates installed during this reporting period was configured with plate spacing of ½-inch, as compared to the standard 1-inch plate spacing used previously. The ½-inch plate spacing had the effect of nearly doubling removal as compared to the standard 1-inch plate spacing. The performance of the additional sets of substrates installed during this reporting period was less than that of the acid-wash treated substrates in a 1-inch plate spacing configuration.

RESULTS AND DISCUSSION

During this reporting period periodic performance measurements were made to evaluate mercury removal of the installed MerCAP™ substrates at Stanton Station. Measurements made with mercury CEMs were made once each month during the reporting period to evaluate and document mercury removal performance. Also, during this reporting period two additional sets of MerCAP™ substrates were installed into the baghouse compartment at Stanton Station. Performance measurements were made on the newly installed substrates to evaluate and document initial removal performance. Of the substrates that were installed recently, two different plate configurations were installed. One set of plates spaced at 1-inch, as had been previously installed, and one set of plates spaced at ½-inch. The two sets of substrates recently installed differ from the initial set in that they were not given an acid-wash pretreatment. Comparisons of the performance of all three sets of MerCAP™ substrates were carried out during this reporting period.

Performance measurements have been made throughout the course of this program to document and demonstrate the mercury removal capabilities of the MerCAP™ technology. Figures 2 and 3 show the data collected during the periodic performance measurements conducted on the MerCAP™ substrates installed in August of 2004 during this reporting period. Mercury concentrations are reported in pounds of mercury per trillion Btu of heat input, calculated from F_c factors provided by the host site. Figure 2 shows performance measurements made during a fuel switch by the host unit. Stanton Station switched from North Dakota lignite (NDL) fuel to a Powder River Basin (PRB) subbituminous fuel during the first week in November. The exact time of the fuel switch can be seen in the shift in exhaust gas temperatures measured across the baghouse compartment where the MerCAP™ array is installed. The significant difference in gas temperatures and the fluctuations seen during the first months of burning PRB at the host unit were observed to have a negative impact on the performance of the MerCAP™ substrates. However, once plant operations were stabilized and flue gas temperatures returned to levels near that preceding the fuel switch, mercury removal performance returned to near 35% for the MerCAP™ substrates installed in August of 2004.

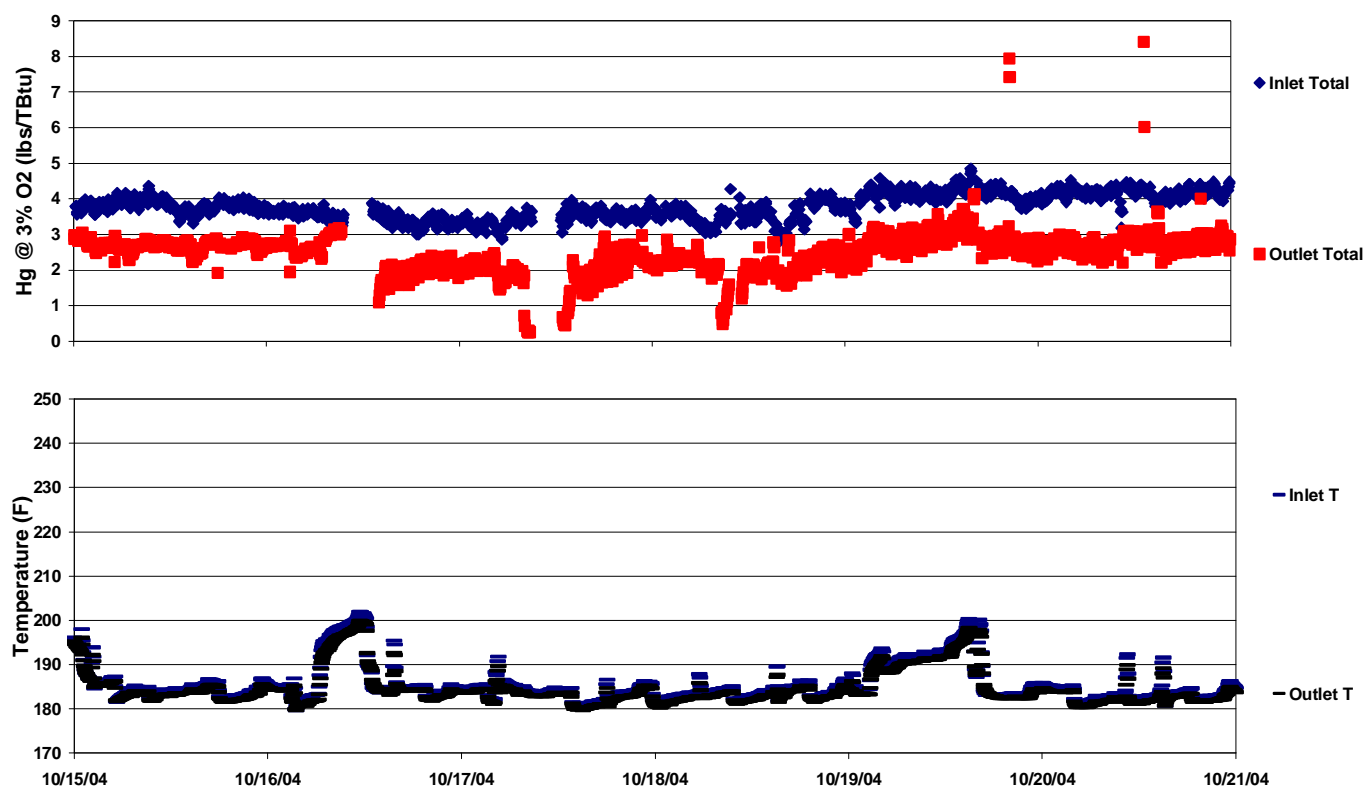


Figure 2. Performance Measurements Oct. 15 – Oct. 21, Total Vapor Mercury

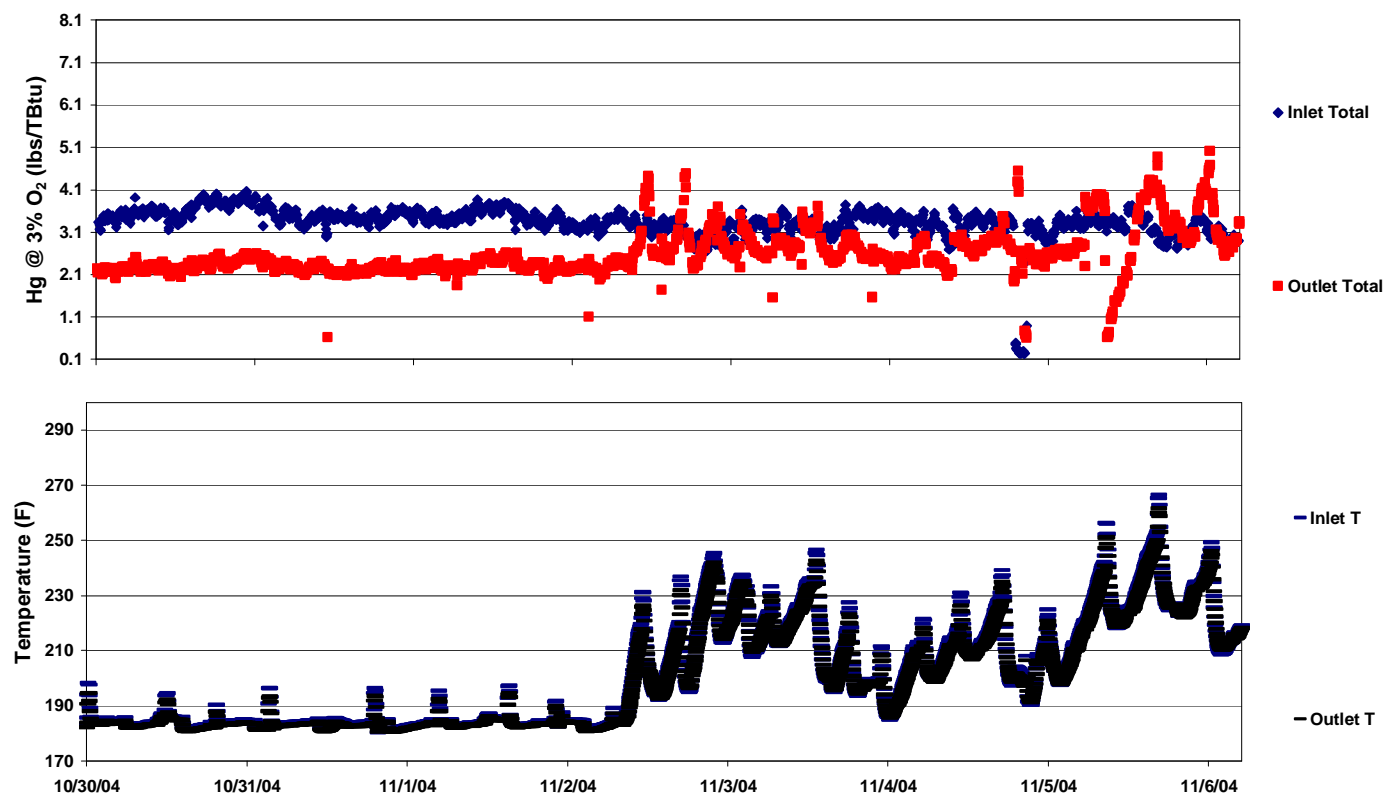


Figure 3. Performance Measurements Oct. 30 – Nov. 7, Total Vapor Mercury

During the third week in November two additional sets of MerCAP™ substrates were installed into the baghouse compartment at the Stanton Station host unit. The substrates were configured in two different plate spacing arrangements. One set of substrates was configured in 1-inch plate spacing, like that of the substrates installed in August, and the other set was configured in ½-inch plate spacing. The substrates installed in November differ from those installed in August in that they were not subjected to an acid-wash pretreatment. The goal was to evaluate both different plate spacing arrangements as well as any performance difference due to the acid-wash pretreatment. Figure 4 shows the initial performance measurements made on the substrates shortly after they were installed. Measurements were also made on the August substrates during this time. The MerCAP™ array is configured as follows:

- Duct Section 1: Substrates installed August of 2004, 1-inch plate spacing, acid washed
- Duct Section 2: Substrates installed November of 2004, 1-inch plate spacing
- Duct Section 3: Substrates installed November of 2004, ½-inch plate spacing
- Duct Section 4: No substrates installed, baseline case

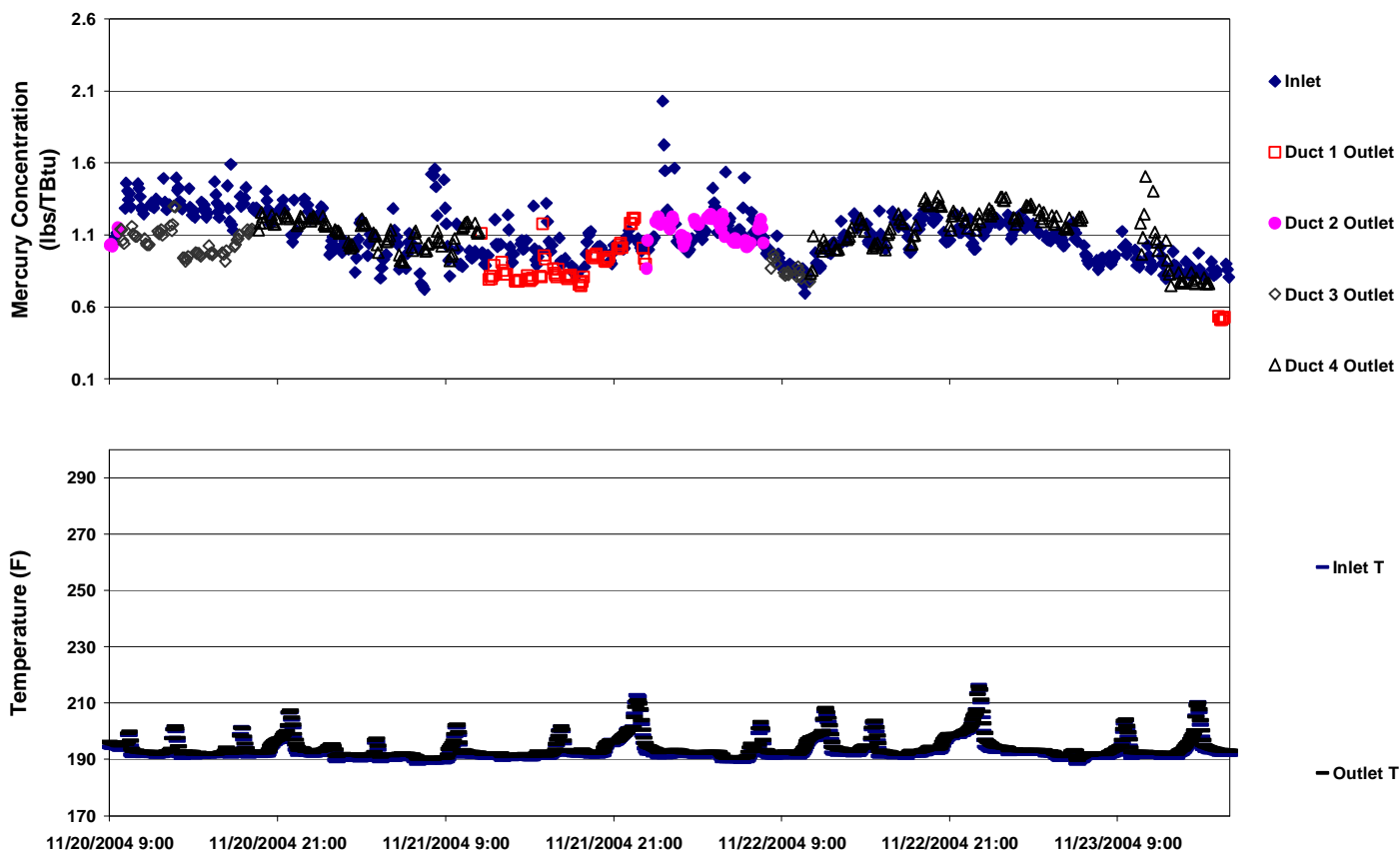


Figure 4. Performance Measurements Initial Installation of MerCAP Substrates Duct Sections 2 and 3, Site 1

Analysis of the data collected as shown in Figure 4 shows the following mercury removal performance for the MerCAP™ array:

- Duct Section 1: 30 – 35% Removal
- Duct Section 2: 25 – 30% Removal
- Duct Section 3: 40 – 45% Removal
- Duct Section 4: No Appreciable Removal

Initial mercury removal performance for the two additional sets of substrates installed during November compared well with the performance of the previously installed substrates. At this point it appeared that the acid-wash pretreatment provided only a marginal boost to the performance of the substrates. In addition, although it was clear that plate spacing had a definite effect on removal performance, the effect did not appear to scale with the same factor as the decrease in spacing.

During second week of December a series of performance measurements were made on the MerCAP™ substrates to evaluate and document continued performance. During this set of periodic measurements both total vapor-phase mercury (elemental + oxidized fractions) as well as measurements to characterize speciation (Split between elemental and oxidized fractions) were made. Figure 5 shows the results of the total vapor-phase mercury measurements and Figure 6 shows the results of the speciation measurements.

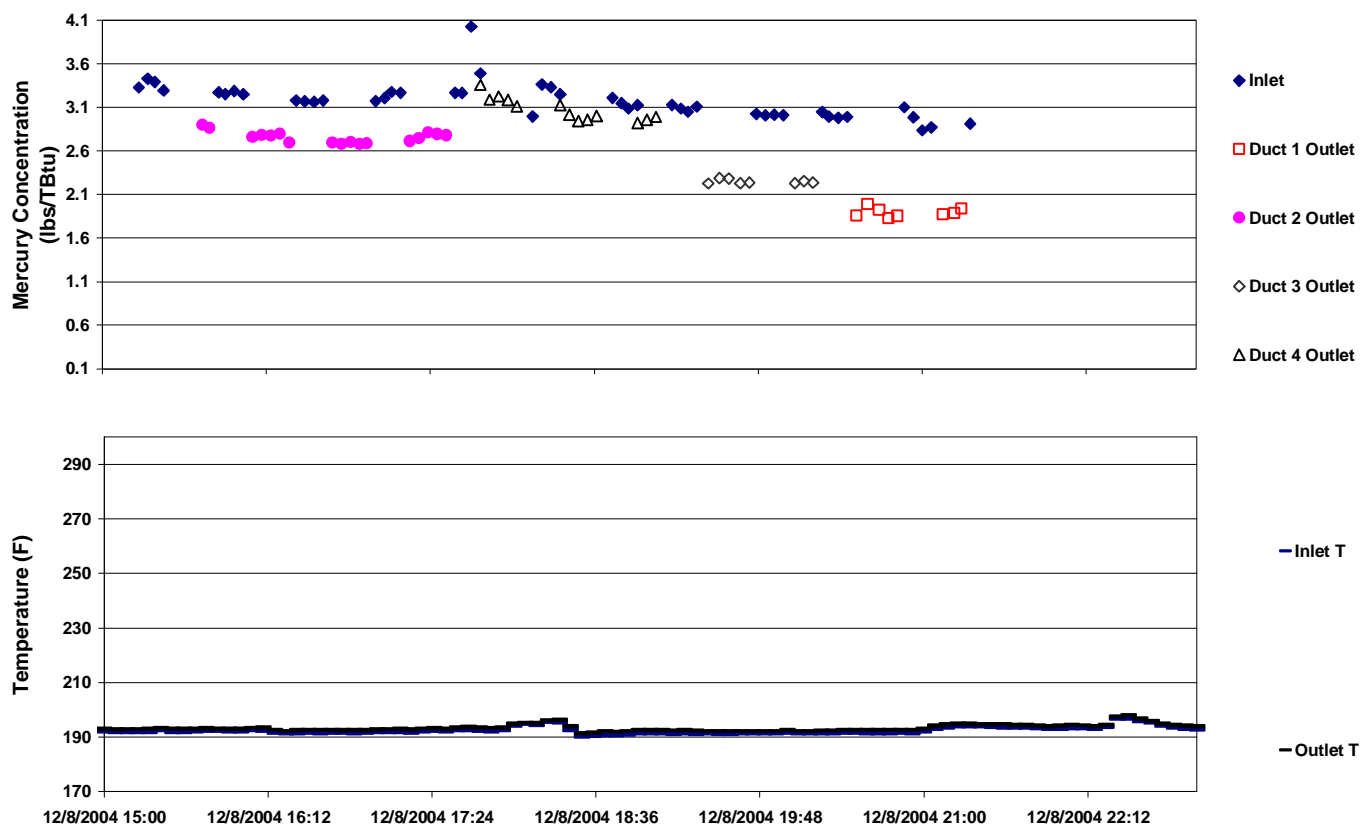


Figure 5. December Performance Measurements, Total Vapor-Phase Mercury

Analysis of the data presented in Figure 5 shows mercury removal performance for the MerCAP™ array as follows:

- Duct Section 1: 30 – 35% Removal
- Duct Section 2: 15 – 18% Removal
- Duct Section 3: 25 – 30% Removal
- Duct Section 4: No Appreciable Removal

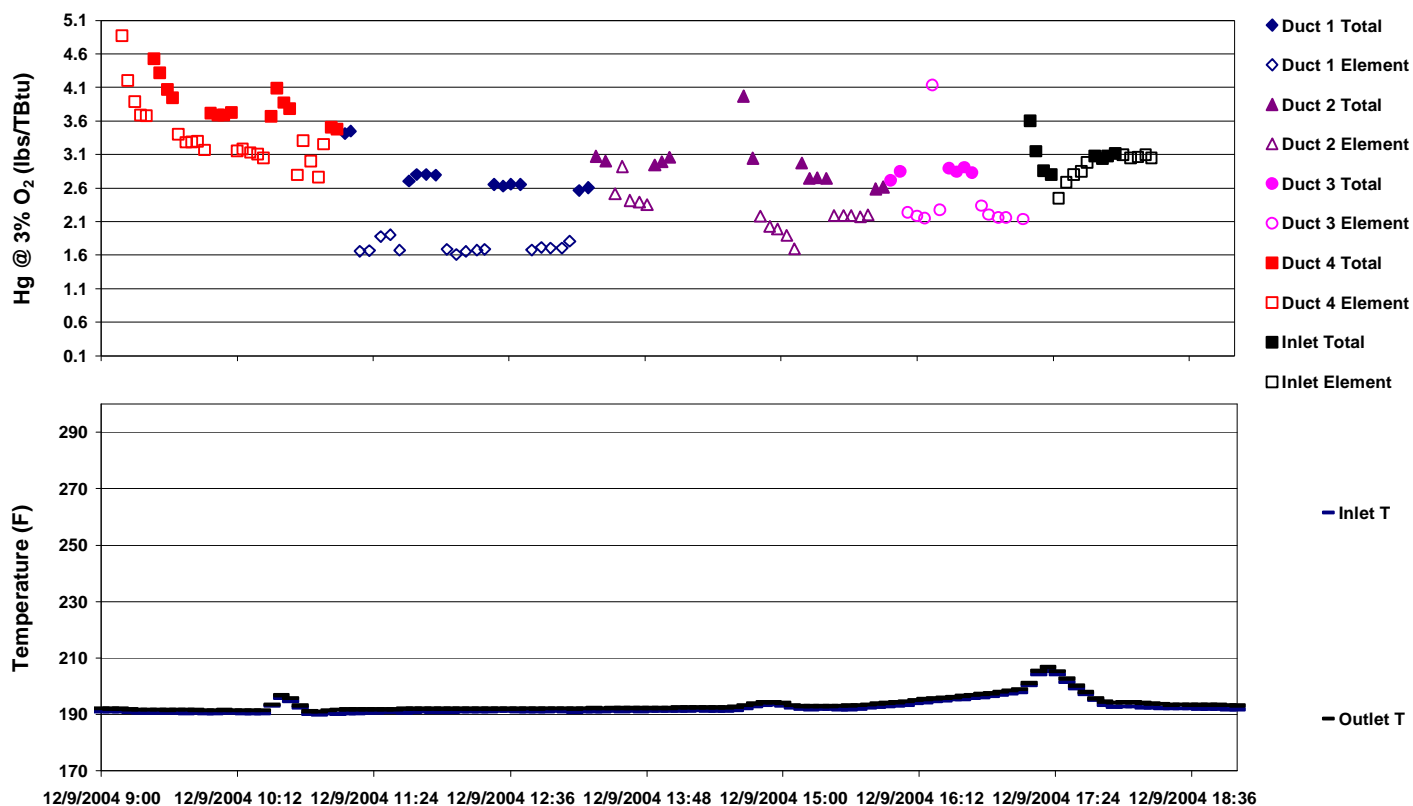


Figure 6. Mercury Speciation Measurements, Site 1

Calculated results for the speciation splits for each of the conditions tested as shown in Figure 6 are as follows:

- Inlet: No appreciable oxidized fraction, 100% elemental mercury
- Duct Section 1: 35 – 40% oxidized fraction
- Duct Section 2: 20% oxidized fraction
- Duct Section 3: 20 – 25% oxidized fraction
- Duct Section 4: 15% oxidized fraction

A summary of the status of the MerCAP™ substrates at the end of this reporting period is detailed in Table 4. Figure 7 details the performance of the MerCAP™ array from the initial installation to the end of this reporting period. Mercury removal performance is calculated as the percent of incoming (inlet) mercury removed by the substrates. Service time is calculated in hours of service from the time of installation, outage periods have not been deducted from the service time total.

Table 4. Substrate Summary

Duct Section	Substrate	Plate Spacing	Install Date	Hours in Service	Average Hg Removal	Measured Outlet Speciation
Duct 1	Acid Treated	1-Inch	8/22/04	3,123	30 – 35%	35 – 40%
Duct 2	Non-Acid Treated	1-Inch	11/18/04	1,035	15 – 18%	20%
Duct 3	Non-Acid Treated	½-Inch	11/18/04	1,035	25 – 30%	20 – 25%
Duct 4	Empty/Baseline	N/A	N/A	N/A	0%	15%

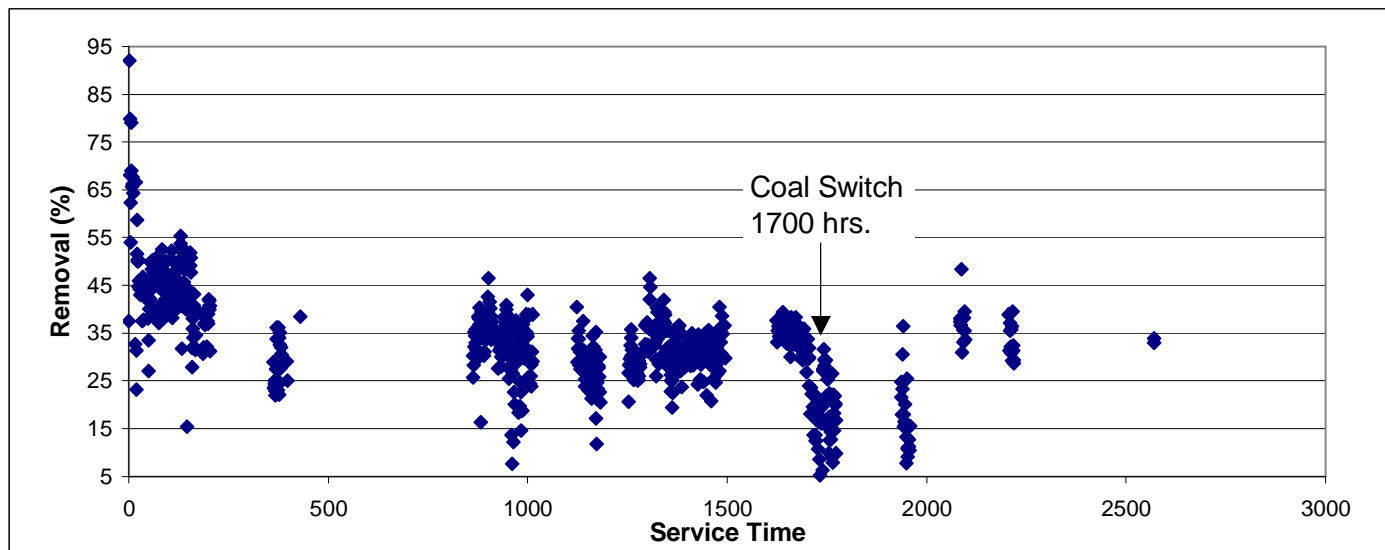


Figure 7. MerCAPä Performance versus Service Time, Site 1

As Figure 6 shows, the fuel switch occurred at approximately 1,700 hours of service time for the MerCAP™ array. Despite poor performance during the early stages of the fuel switch the removal performance has restabilized and remains at approximately 35%. It is believed that much of the performance variability observed during the fuel switch of the host unit was due to changes in operating parameters for the facility. During the initial stages of the fuel switch exhaust gas temperatures were both variable and elevated in relation to conditions observed prior to the fuel switch. It was observed that the temperature of the gas stream had a direct correlation to the removal performance of the MerCAP™ array. Figure 8 shows the removal performance of

the MerCAP™ array versus recorded gas temperatures. Mercury removal performance is generally lower as gas temperature increases. In addition periods of negative mercury removal, higher mercury concentrations at the outlet as compared to the inlet have been observed during rapid temperature swings. Figure 9 shows several such temperature excursions as observed during the first weeks of the fuel switch.

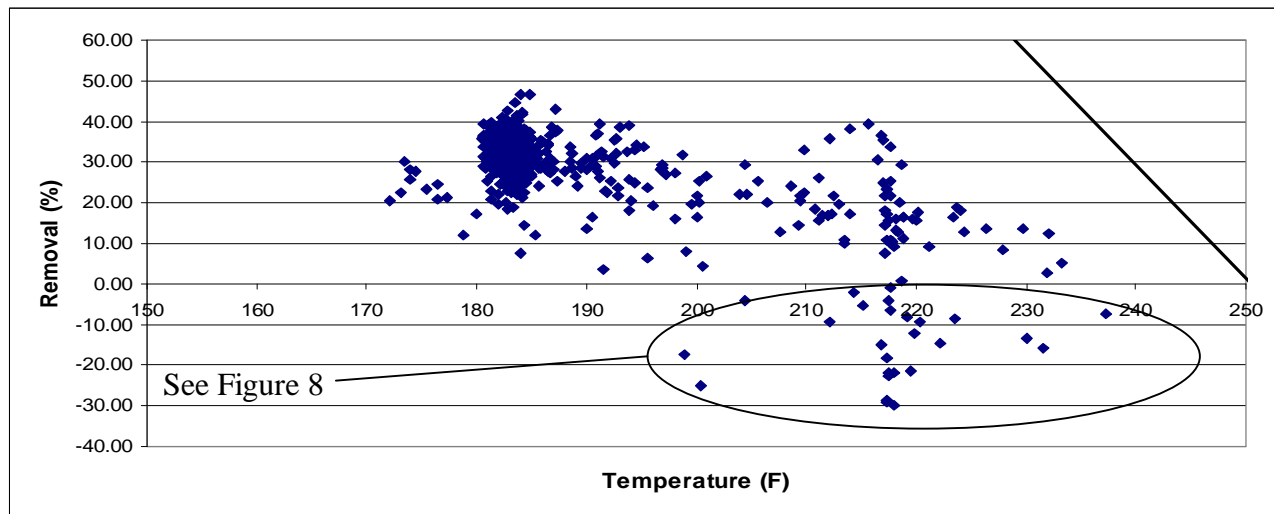


Figure 8. Performance versus Gas Temperature, Site 1

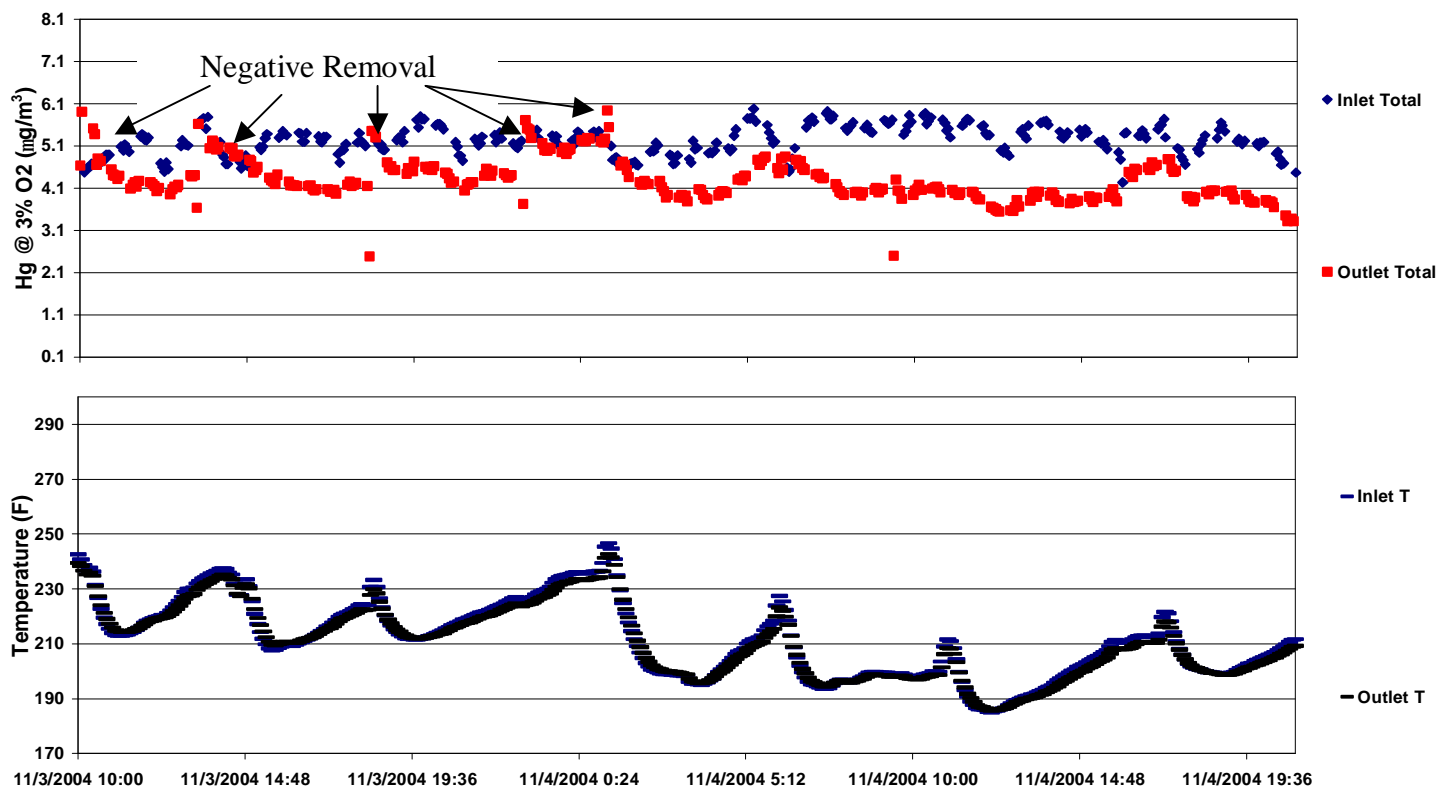


Figure 9. Temperature Excursions with Negative Mercury Removal

Figure 9 clearly demonstrates the observed effect of operating temperature on the mercury removal performance of the MerCAP™ array. Periods of low or even negative (outgassing) removal correspond exactly with high points in the temperature curves, seen in the lower graph.

Also during this reporting period evaluation of the effects of both plate spacing and acid pretreatment on the performance of the MerCAP™ technology were performed. As detailed above these variables were investigated by installing two additional sets of MerCAP™ substrates. These additional substrates were installed in duct sections 2 and 3 of the MerCAP™ array in the baghouse compartment of the host unit. Mercury removal performance was monitored and compared to that of the previously installed substrates in duct section 1. Table 5 summarizes the performance of each of the three sets of MerCAP™ substrates.

Table 5. MerCAP™ Substrate Summary Site 1

Substrate	Plate Spacing	Acid Treatment	Mercury Removal	Speciation
1	1-inch	Yes	30 - 35%	35 – 40%
2	1-inch	No	15 – 18%	20%
3	½-inch	No	25 – 30%	20 – 25%
Baseline	N/A	N/A	0%	15%

As can be seen from the data presented in Table 5, there are definite differences in the performance of each of the three sets of substrates. Substrate set 1 has the highest overall removal performance and is the only set that received an acid-wash pretreatment. Comparing sets 2 and 3 indicates that the plate spacing of the substrates has a definite effect on overall removal performance. Decreasing the plate spacing by a factor of two, which doubles the amount of substrate, increased the overall removal performance by nearly 100%.

It is unclear at this moment whether the speciation fraction seen at the outlet of duct section 1 is due to the service time of that set of substrates or perhaps due to the acid pre-treatment. Further investigations of the outlet speciation fractions are to be carried out during the next reporting period to provide additional data and observations.

CONCLUSION

The installed MerCAP™ Full-Scale array is still operating without any degradation of performance being observed. As of the end of this reporting period the MerCAP™ array has operated for 1,700 hours on North Dakota Lignite and over 1,400 hours on Powder River Basin Subbituminous with comparable performance. It is clear that the viability of the technology is not dependant on fuel categorization.

Testing during this reporting period has demonstrated that an acid pre-treatment of the MerCAP™ substrates has a significant effect on the overall mercury removal performance of the technology. In addition the plate spacing arrangement of the substrates has been shown to have an effect on the overall removal performance.

As a result of the fuel switch at Site 1 the temperature of the flue gas in which the MerCAP™ substrates are placed has been shown to have a direct effect on the mercury removal performance of the technology. In general, mercury removal performance decreases as duct temperatures increase, even to the point of desorbing previously absorbed mercury. From the data collected it appears that temperature excursions do not cause any permanent damage to the substrates. There is currently no evidence to suggest that temperature excursions have any negative impact on the substrates themselves or their longevity.

REFERENCES

No references.